ABSTRACT OF THE DISCLOSURE

In a wide-coverage network comprising electronic edge nodes interconnected by bufferless core nodes, where each edge node comprises a source node and a sink node, both sharing an edge-node controller and having means for data storage and managing data buffers, the transfer of bursts from source nodes to sink nodes via the core nodes requires precise time coordination to prevent contention at the bufferless core nodes. A core node preferably comprises a plurality of optical switches each of which may switch entire channels or individual bursts.

Each source node has a time counter and each core node has at least one time counter. All time counters have the same period and time-coordination can be realized through an exchange of time-counter readings between each source node and its adjacent core nodes. The time-counter readings are carried in-band, alongside payload data bursts destined to sink nodes, and each must be timed to arrive at a corresponding core node during a designated time interval. The difficulty of securing time-coordination arises from two interdependent requirements:

communicating a time-counter reading from a controller of a source node to a controller of a core node requires that the source node be time-locked to the core node, and

time-locking a source node to a core node necessitates that a controller of the core node be able to receive a time-counter reading from the source-node controller during a designated interval of time.

To initiate or restore time locking, a secondary mechanism is required for directing upstream signals received from source nodes toward said master controller. The present disclosure provides such mechanisms.